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19 April 1982

USSR Report

ENERGY

No. 97

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ELECTRIC POWER

DESIGN, CONSTRUCTION OF TETS-ZIGM

Moscow PROMYSHLENNOYE STROITEL'STVO in Russian No 11, Nov 81
pp 14-17

/Article by V. I. Grech, USSR State Committee for Construction Affairs, and S.B. Grobokopatel;, VNIPIenergoprom /All-Union Scientific Research and Planning Institute for the Construction of Power Enterprises/: "New Methods of Designing, Assembling and Constructing Thermal Electric Power Stations (TETs-ZIGM)"/

> /Text/ From the editors: The USSR Council of Ministers 1981 prize has been awarded to the large collective of designers, builders, operators, and workers of the enterprises of the USSR Ministry of Power and Electrification for the design and construction of the gas and fuel oil /mazut/ TETs of an increased plant readiness (in the example of the Kaunasskaya and Kuybyshevskaya TETs).
>
> The creation of a series-produced gas and fuel oil TETs of an increased plant readiness is the final word in Soviet designing and construction. For the first time in the USSR 14 TETs's are being built according to designs consisting of standard construction-technological sections.
>
> Through the repeated use of finished solutions the volume of technical documentation for its adaptation to specific conditions is much less than in the usual design. Large economic savings are realized both from the use of sets of construction sections and of equipment of an increased plant readiness.
>
> The editors of this journal believe that this interesting experience can be emulated for the creation of other industrial facilities as well.

The construction of power facilities is one of the most capital-intensive sectors of the economy. Significant economic advantages accompany the development of a combined method for the production of both heat and electricity. For this reason the long-term plan for the development of the USSR's power industry calls for the construction of more new heat and electric power plants; this in turn requires considerable amounts of capital investments. These costs can be reduced by increasing the economicalness of designs and methods of constructing heat and electric power plants.

One of the key trends of technical progress in the construction of heat and power plants is the standardization of designs for heat and power plants. As the result of the standardization of the elements of construction structures, the extensive use of reinforced concrete that has been preassembled, the progressive technology of its manufacture, the use of improved means of mechanization and the increase of the average capacity of the power units during the period from 1959 through 1970 there has been a reduction in the relative labor expenditures from 12 to 14 to 4.5 - 4.7 man-days per kilowatt.

As demonstrated by practice, to increase the output in construction and installation work and to reduce labor expenditures in construction one can improve the design solutions and further industrialize structures and units, improve the organization of work and increase the level of mechanization. The greatest reserve is to be found in the design solution; the greatest efficiency of construction and installation work is connected with the standard design.

Efforts to execute a standard design of a GRES-TETs and to use it more than once were unsuccessfull prior to the 1970's. Due to the large amount of equipment available, the broad range of required capacity for electricity, steam and hot water, and considering the wide range of geographic conditions, in the best case they managed to make partial use of this or that design on several ocassions, but only with several changes as they applied to each specific case, which in actuality led to individualized designing.

For the first time in Soviet practice of designing and constructing heat and electric power plants the main housings of 14 TETS's are being constructed according to unified, unaltered standard design blueprints. Of these, 11 are already in operation. During the 10th Five-Year Plan 24 turbogenerators and 25 steam generators were put into operation at these heat and power plants; by the end of the five-year plan these units had produced 18.6 billion kilowatt-hours of electricity and 30.7 million Gcal of steam. In contrast to the individual designing used for the other TETs's, the TETs-ZIGM /ZIGM - plant-manufactured gas and fuel oil heat and power plant/ was designed from standard comprehensive construction sections of an increased plant readiness.

The designing and adoption of a comprehensive series-produced working design for repeated use required a radical change in the existing technology for designing, in which the principle of an individual approach to a TETs is fully replaced by the principle of the individual approach to the separated element of the complex, which can be designed by observing the requirements of a standard that has been estimated for repeated use over a period of several years.

According to the new technology the design of a TETs-ZIGM consists of blueprints that have been developed in a design sense with coded construction sections, assemblies or units of an increased plant readiness. These elements can be combined in an unaltered form, thereby forming the necessary set of working blueprints for a specific construction project. On the basis of this technology a standard, series-produced comprehensive design for the main housing and auxiliary facilities of a TETs-ZIGM has been developed. This includes all portions of the construction undertaking (construction, thermotechnical, electrical, control systems and sanitary engineering work and others) at the working blueprint stage, including the customer specifications and estimates for the working blueprints.

By taking into consideration the diversity in the required amounts for the production of industrial steam and hot water for the heating and industrial-heating TETs the design makes it possible to construct a TETs of any assigned rated capacity with the installation at the power plants of a full gamut of central heating turbogenerators at steam parameters of 130 atm/550 degrees C: PT-60-130/13, PT-80/100-130/13, R-50 of the Leningrad Metallurgical Plant, T-100/120-130/3, PT-135/165/15 T-175/210-130/3 of the Urals Turbomotor Plant.

The design stipulates the placement of all of these turbogenerators in the main housing in any assigned sequence for various TETs without changing the working documentation in the composition of the design.

Thus, the design of the main housings with consideration of the basic equipment to be used consists of the following comprehensive construction and technological sections (number and width in meters):

"Uniform face"	2X12=24
PT-60 with one boiler	2X12=24
T-100 with one boiler	2X12=24
R-50 with one boiler	2X12=24
PT-135 with two boilers	4X12=48
T-175 with two boilers	4X12=48
"Temporary face"	1X12=12

Figure 1 shows these sections and the schematic plans for the main housings of the TETs-ZIGM's, which have been executed by a series of sections. This made it possible to assemble a finished

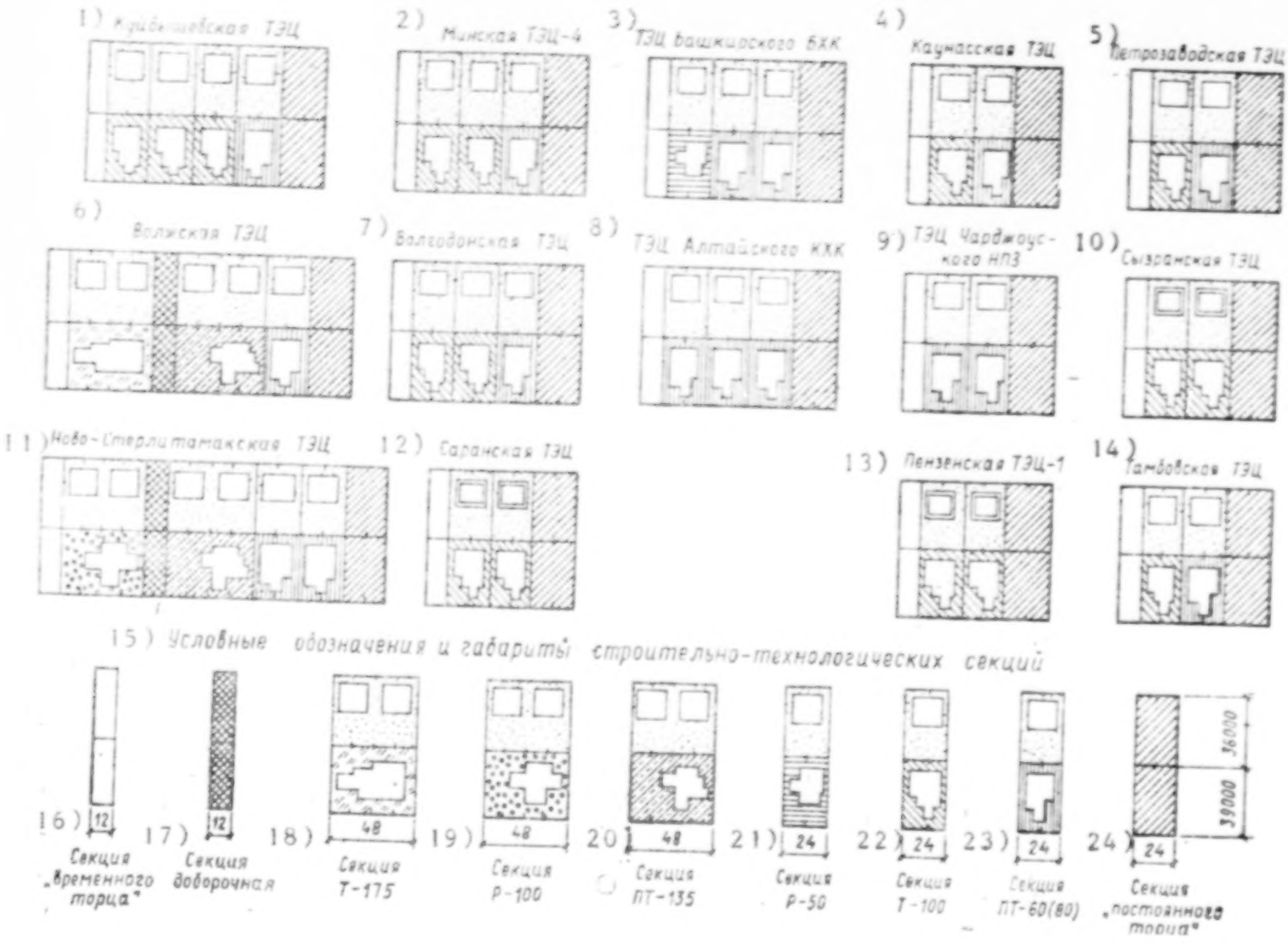


Figure 1. Configuration of the main housings of TETs-ZIGM by the series of construction-technological sections.

Key: 1) Kuybyshevskaya TETs; 2) Minskaya TETs-4; 3) TETs of the Bashkir BKhK; 4) Kaunasskaya TETs; 5) Petrozavodskaya TETs; 6) Volzhskaya TETs; 7) Volgodonskaya TETs; 8) TETs of the Altayskiy KKhK; 9) TETs of the Chardzhouskiy NPZ /oil refinery/; 10) Syzranskaya TETs; 11) Novo-Sterlitamakskaya TETs; 12) Saranskaya TETs; 13) Penzenskaya TETs-1; 14) Tambovskaya TETs; 15) Conventional designations and sizes of the construction-technological sections; 16) "Temporary face" section; 17) Gathering section; 18) T-175 section; 19) R-100 section; 20) PT-135 section; 21) R-50 section; 22) T-100 section; 23) PT-60(80) section; 24) "Uniform face" section.

technical documentation for the main housings by using a series of working blueprints for the comprehensive construction-technological sections, which correspond to the composition of specific TETs being designed. Of the total amount of all working standard documentation of the main housing of the TETs-ZIGM, 40 percent of the blueprints are used 40 times and 50 percent from 12 to 20 times.

Based upon the practice of making repeated use of the working documentation of the design of the main housings of the TETs-ZIGM for specific construction work it has been established that the amount of technical documentation for adapting the design to the specific conditions represents from 10 to 15 percent of the amount of documentation obtained within the design of the TETs-ZIGM. As a result of doing the design work according to the new technology, the number of designers participating in the design work of the main housings is reduced by 6 to 8-fold. The economic savings in just the designing work through the repeated use of standard blueprints for 14 TETs's is three million rubles; and the reduction in labor outlays for designers results in a savings of 150,000 man-days.

One of the decisive factors aimed at the industrialization of construction and installation work and a significant reduction in labor outlays at the construction site is increasing the plant readiness of the construction materials being delivered to the site; this is also true for the technological equipment that is brought in.

Based upon the experience in adopting the TETs-ZIGM design it has been established that the plants which manufacture both the construction materials and the equipment agree to produce articles of a high plant readiness under the mandatory condition that these articles will be supplied repeatedly according to unified unaltered working blueprints. This condition can be fully observed only when there is a comprehensive standard design for repeated use. This condition is made difficult when individual designs are used. In connection with this in designing the units of the construction structures and equipment, special attention is devoted to the development of working blueprints of these elements, which provides an increased plant readiness by observing a rational transportability, installation and plant technological effectiveness with consideration of the standard configurations of the solutions for the TETs-ZIGM.

Examples of the use of unit elements of an increased plant readiness for the main housing of a TETs-ZIGM are shown in figures 2 through 7.

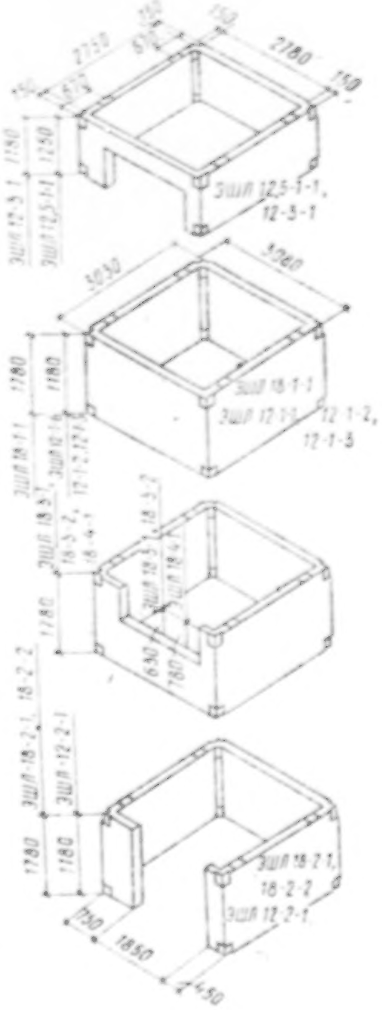


Figure 2. Preassembled reinforced concrete structures for a mine shaft with a lifting capacity of two tons.

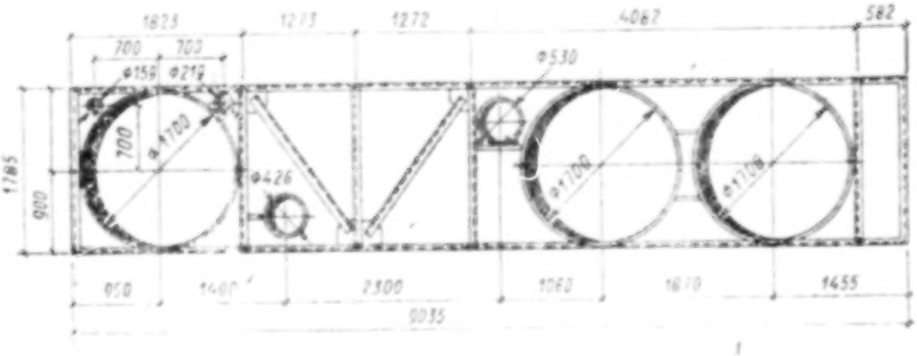


Figure 3. Claydite concrete wall panel with openings for the passage of technological connecting lines.

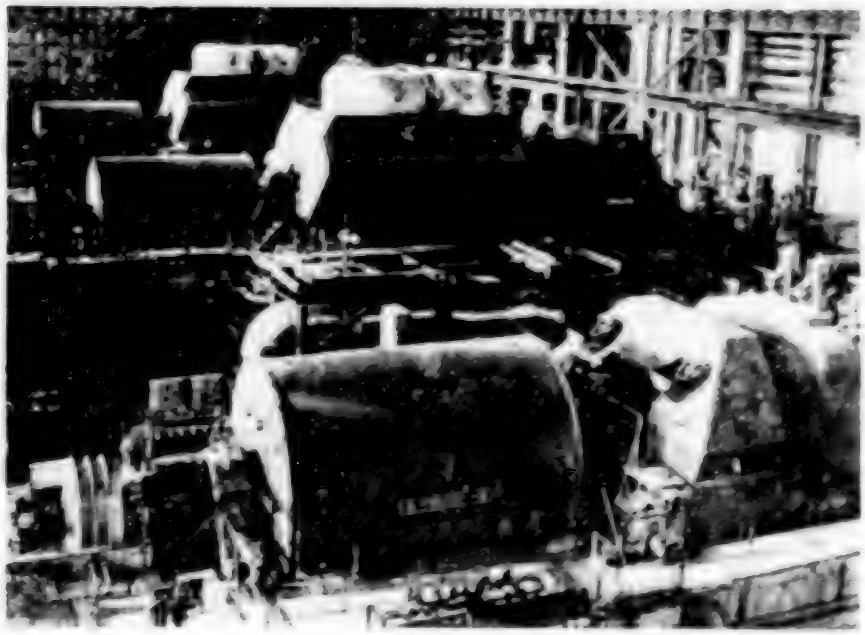
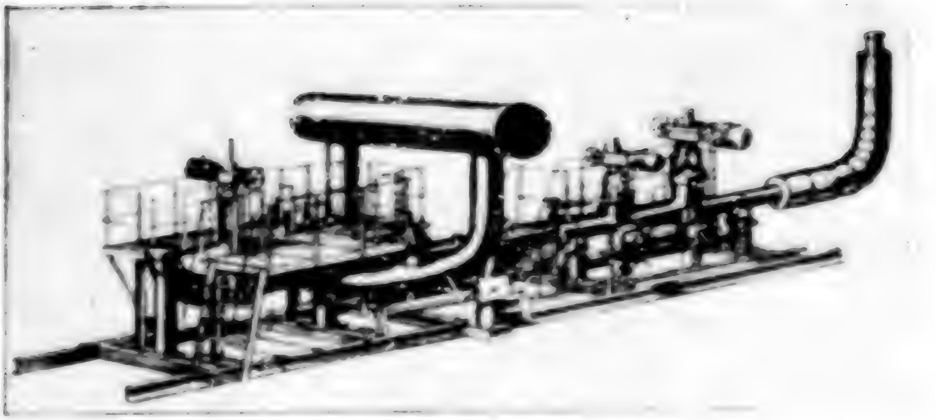
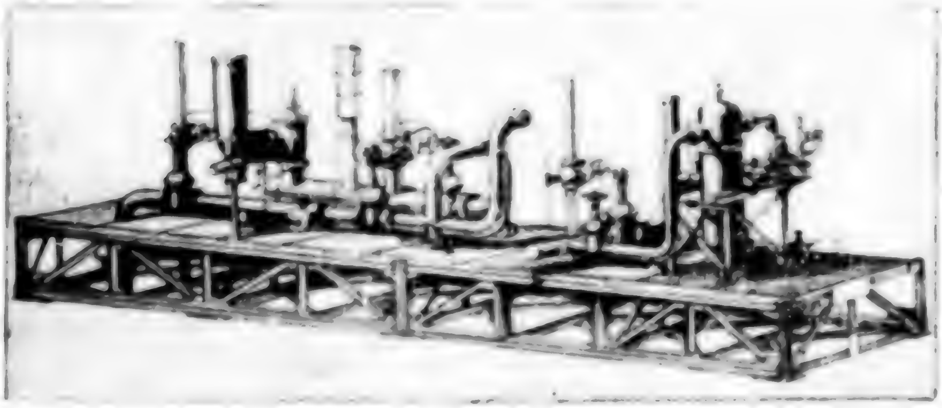


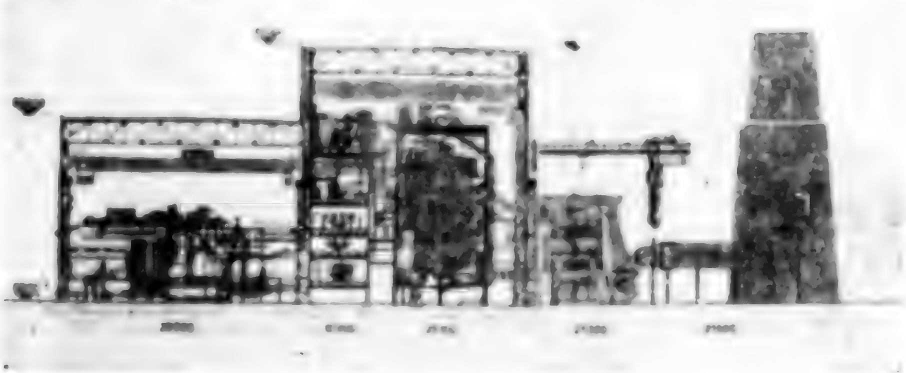
Figure 4. General view of a machine room of a TETs-ZIGM.

Comprehensive, unitized three-dimensional units of pipelines and auxiliary equipment have been developed and are in use. All equipment and pipes have been incorporated in three-dimensional metal structures, which at the same time perform the role of technological and construction structures of between-floors spans of the main housing, on which they are located. The complex units are enlarged to maximum sizes for handling by the railroads. Enlarged flat units have also been developed.

Within the support metal structures of the main housing are included structures for securing the equipment and several others. Configuration and design solutions, aimed at increasing the industrialization of the construction, have been used in the design. This includes the dual-span configuration of the main housing with a boiler deaerator stack built into the span in contrast to the traditional three-span, which makes it possible to install the auxiliary equipment and pipelines in a large-unit execution using the bridge cranes of the boiler facility (See Figure 7). In contrast to the traditional configuration, in which the floor of the machine room is situated at the -3 to -4 meter marks, in the design the floor elevation of the machine room is raised to the day-time surface. Such a solution decreases the amount of earth moving and concrete work, eliminates the need for waterproofing work, and significantly increases the comfort of the conditions for the operating and maintenance personnel (day-time lighting, eliminating the possibility of flooding, especially when there are high ground waters). In the previously used design solutions for the ground







Key: 1) Figure 5. [illegible]-340/10 unit of the PT-60-130 turbogenerator (reduction in labor outlays for its assembly is 40-fold as compared with installation by pouring). 2) Figure 6. A unit of pipelines of the generator stage of the PT-60-130 turbogenerator (reduction of labor outlays for installation is 10-fold as compared with installation by pouring). 3) Figure 7. Cross-section of the main housing of a TETs-FIGM.

clearing work [zero cycle] of the machine room all auxiliary equipment and reinforced concrete columns underneath the span of the servicing level was supported on numerous, various shaped foundations that had been driven deep into the ground. In the new design a reinforced concrete heavy-duty slab is used, which is stacked at the .5 meter level. The equipment and construction structures are secured in drilled openings of the heavy-duty floor using an epoxy glue or cement solution.

The lifting capacity of the bridge cranes of the machine and boiler sections is reduced by the use of special tackle attachments using the supporting capability of the metal structures of the bridge cranes and increasing the frequency of the block and tackle assemblies of the basic lift.

The design of the metal structures of the main housing stipulates their "non-alligned installation". A new structure of non-welded fastening of wall enclosure panels has been developed. The complete preassembly of construction structures for the above-ground portion of a building has been provided.

The economic savings from the development and adoption of these progressive design solutions is 9 million rubles and labor outlays have been reduced by 156,489 man-days. The savings in steel were 10,190 tons and in reinforced concrete - 15,973 cubic meters.

Experience in the adoption of the TETs-ZIGM design has shown that in using the new method of designing, which is based upon the use of comprehensive construction-technological sections of an increased plant readiness, one can reject the traditional, irrational individual method of designing each TETs and switch to the designing and construction of the basic facilities of a TETs according to a unified standard working documentation that can be used repeatedly. The use of this method in constructing 11 TETs's has proven the real opportunity of sharply reducing labor expenditures in the designing work. Moreover, one can reach an agreement with the manufacturing plants concerning the unified technical conditions for the delivery of equipment and construction structures of an increased plant readiness and order from the manufacturing plants sets of auxiliary equipment and construction structures entirely for each construction-technological section without presenting the technical documentation by "codes" of these sections, to provide in good time the construction projects that are being built according series-production designs with working documentation on an early basis. Provision is also made for the repeated use of progressive schematic, configuration and design solutions, which are outlined in the standard series design. In cases when the auxiliary equipment or construction parts are substituted by improved versions the general designer makes the appropriate changes to the standard documentation from a centralized position, without disrupting the integrity of the design. In making use of this documentation, one can develop unified norms and assessments for the performance of work for the brigade contract in the construction of all TETs-ZIGM's.

When using a TETs-ZIGM design it is no longer necessary to keep a group for designing work at the construction projects, because all errors in the series design can be eliminated at the initial lead construction projects.

The standard series designs must and can be subjected to careful scrutiny by the scientific-technical council of the USSR Ministry of Power and Electrification and the Main Administration of State Experts of the USSR State Committee for Construction Affairs prior to their adoption. They should also be thoroughly discussed by engineers. This is almost impossible when examining a large number of individual designs.

Based upon the standard series blueprints of the construction-technological sections and taking into consideration the possibility of the modification of the main housing made of a different series of these sections, a reference guide has been developed for the standard design for the execution of work (PPR), in which in addition to the methods of construction are shown the requirements for the quality of the work, the schedule for the delivery to the construction site of construction structures, semimanufactures and materials has been compiled. On the basis of this standard document the center for the scientific organization of labor and management in the power construction work of the USSR Ministry of Power and Electrification, Energostroytrud, has developed and published the unified "Expanded norms and assessments for the installation of steel structures of the TETs-ZIGM". These norms have been made available on a broad basis.

In using the experience of designing and building the main housings of TETs-ZIGM's, a technical design for the main housings of TETs-ZITT has been developed for working with solid fuel. In the design a unified gas-tight boiler has been taken with a productivity of 420 tons per hour and a series of turbogenerators that are used in the design of the TETs-ZIGM.

For the construction-technological sections of the TETs-ZITT /plant manufactured solid fuel heat and power plant/, the blueprints for the machine room and the deaerator stack of the TETs-ZIGM were used extensively. The working blueprints of this design are presently being developed according to a plan for the standard designing of the USSR State Committee of Construction Affairs. In the fourth quarter of 1980 the technical design of the main housing of the TETs-ZITT was compiled. It called for the use of T-180 turbines and boilers with a productivity of 670 tons per hour. In observing the principles of the construction-technological sections a unified technacial working design was developed for the combined auxiliary housing (OVK) for the TETs-ZIGM and the TETs-ZITT.

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LAGGING AT NGDU 'LENINNEFT'' DISCUSSED

Ashkhabad TURKMENSKAYA ISKRA in Russian 27, 28 Feb 82

[Article by V. Antonishin, special correspondent of TURKMENSKAYA ISKRA: "Many Unused Reserves"]

[27 Feb 82 p 2]

> [Text] 1. Why Things are Not Getting on Well
>
> The Basic Directions stipulate that oil extraction in the country (with gas condensate) be brought in 1985 to 620-645 million T. The collective of the production association "Turkmenneft'" has also been called upon to make its contribution to solving this problem. But not all of its subdivisions are working smoothly. NGDU [Oil and Gas Building Administration] "Leninneft'", for example, has not coped with the assignments for this year. It underproduced 72,000 T of oil. The January program for this year has been interrupted.
>
> This published article relates certain reasons for the lagging in the collective and what is being done to overcome the omissions.

Working Nebit-Dag gets up early. Dense twilight still hangs above the city and the line of watchman buses approaches the oil fields. It would be no exaggeration to say that the engineering creative preparation for the next work day begins from precisely this moment. Short meetings take place at the bus stop and business discussions in the buses. Drilling foreman V. Sakhnov and his subcontractors brigade foremen of the derrick installers I. Yermolovich and electric installers I. Mikhalyuk make the final correction into these models of labor organization. The leaders of the brigades of underground well repair B. Baldzhanov and O. Garayev exchange news. But the leaders of the NGDU "Leninneft'" the largest in the association have the greatest worries. It is not surprising: every day the amount of unextracted oil increases at its fields.

The bus in which we are riding holds the chief engineer of the administration R. Allakhverdiyev and the secretary of the party committee T. Tagangel'dyyev. They assert, and not without grounds, that the collective is not lacking in skill or high consciousness. For many years it has been on the right flank of the competitors. The administration has strong party organization. It has over 140 communists, 15 percent of the total number of workers. There is no shortage of wells. There are about a thousand of them. Nevertheless things are not going well.

Certain reasons for lagging have become clear even on the road. As we approach [illegible]-Tepe, the rocker machines installed on the wells tell a lot. Only some of them, bowing to the earth, have pumped oil out of the depths, others are still with immobility.

We recall the complaints of the administration oil workers: the well fund has been neglected. They explained what is hidden behind this word. Of the total number of over 200 wells, about 25 percent are low-output yielding 2-3 T of oil per day. There are many inactive ones. Not because there is no oil in the beds. It is there, but in order to extract it, it is necessary to repair the wells or to switch them to a more efficient method of extraction.

It cannot be said that little is being done in the administration for this. The efforts of the oil workers have given second life to many wells. The brigade of major repair S. [illegible] is distinguished in this work. Well No 397 yielded only 5 T of oil per day for a long time because of flooding. The "doctors" made it a high-output well. Now 120 T are removed from this artery. It is true that this required expenditure of a lot of forces and energy. The repair was made and the water access was closed. The same was done to well No 191. Influx of oil rose 10-fold.

Thermal-gas-chemical modification of the bed, the use of an inhibitor, rod rotors, insulation of the water influx by pumping polyacrylamide, and finally, the gas lift yield good results.

Without any doubt, all the wells in the operating fund can be made highly productive. This requires timely and high-quality implementation of a set of geological-technical measures. Calculations show that in order to fulfill the set plan, it is sufficient to extract a daily average output of 15 T in each well. What is interfering?

"We do not reach all the wells, we have few repair brigades, there is a shortage of trucks, excavating machines and certain units," explains the head of the NGDU V. Zakharov.

There is a large percentage of truth in his words. The administration has only nine brigades of underground and eight brigades of major repair of wells. This is of course insufficient for the thousand wells. The demand is much greater than what is offered. This circumstance gave birth to a, to put it mildly, strange practice among the leaders of the administration. They guaranteed fulfillment of the plan through the high-output wells. At the same time, it is common knowledge that increase in oil output without sufficiently effective systems of maintaining the formation pressure results in rapid exhaustion of the energy of the bed and decrease in extraction. This essentially happened. Last year, for example, the regimes were improved at 51 wells and they were removed from among the low-output. But almost the same number of other wells that were not cared for remained low-output.

One can think that the oil workers do not have documents regulating the operation of the field. They do. There is no shortage of such scientifically substantiated documents. The Azerbaijan scientists jointly with the workers of "TurkmenNIPIneft'" 3 years ago approved standards of oil outputin the region. But in 1980 at the Leninskoye field 60,000 T of oil were extracted above the standard, and next year almost 2.5-fold more. At the same time, decrease in formation pressure was not sufficiently compensated for.

A number of omissions could be avoided if the leaders of the NGDU "Leninneft'" made more efficient use of repair brigades. Not all of them are working to full measure. The brigades of underground well repair are idle over 12 percent of the working time because of a shortage of transport and excavating mechanisms. After resolving to correct the situation, chief engineer of the association "Turkmenneft'" P. Polyubay approved an order for supplying the repair men with equipment. In particular,instead of 16 plugging units as before, almost 30 percent fewer were allocated. Thus, the most important operations to restore the wells are not fulfilled in time. The same happened with the bulldozers. There are few of them, therefore the mouths of the wells and the approaches to them remain uncleaned. The shortage of steam units inhibits cleaning of the discharge lines from paraffin.

"Our field has been flooded," says the operator of oil field No 2 S. Mirzatayev. "In order to stabilize the extraction, a systematic modification of the bed is required, but the brigades of major repair are not coping with this problem. Last year the working regime was improved at less than 30 out of 211 wells. This is far from sufficient."

It would be incorrect to assert that the association "Turkmenneft'" is not concerned with the situation in NGDU "Leninneft'." The educational combine is now training over 150 people to supplement and to create new repair brigades. The graduation will take another 6 months. The oil extractors of the administration consider it expedient to approach training in a differentiated manner, that is to train the more prepared people on an abbreviated program. It seems that the suggestion is reasonable and feasible.

[illegible]

> [Text] "Expand the use of new methods for modifying oil beds and by this means increase the extraction of oil from the depths. Introduce an advanced method of gas lift operation of wells and highly productive submergible electric pumps."
>
> (From the Basic Directions of Economic and Social Development of the USSR).

Energy of the Bed

Everyone knows that one cannot count on further extraction of oil at the fields of the NGDU "Leninneft'," measures for artificial modification of the bed are necessary. This work is underway. Injection of water into the depths of [illegible] Kotur-Tepe has begun. Over 20,000 m^3 of water is pumped in daily. One of the most effective and economical methods of extraction, as proved by practice, is switching the wells to the gas lift method, injection of gas into the productive layer.

Some success has been achieved in this work by the collective of field No 2 headed by G. Bobryshev. He is the only one in the NGDU to fulfill the January plan. He was helped by the fact that here, 140 out of the 224 wells are gas lift. The task was set of increasing the energy of the bed, and increasing the output of oil. A high-debit gas well No 12 was used for this purpose at the Komsomol'skiy area. The operating regime of the oil arteries improve with an increase in pressure at the level.

The innovators gave their word. One of the best operators of section No 3, [illegible] K. Amanberdyyev suggested expanding the gas-distributing batteries and switching the paired wells to individual operating regime. The effect exceeded expectations. The oil extraction at well No 21, for example, increased by almost 100 T per day.

But it is not always successful in subordinating gas to the will of man it is true. Often a situation develops where a lot of gas enters the level, but oil does not appear. This means that the working replacement did not displace but suppressed it. A valve is used for purposeful effect of the gas. Its use guarantees gas supply under the low level of occurrence of the oil.

But the collective is still not making complete use of its potentialities for organizing the process of liquid fuel extraction. This is due to a number of circumstances.

"The rise in oil extraction is being seriously hindered by a shortage of high pressure working gas," related G. Bobryshev. "The majority of available gas wells are low-output. They are not capable of supplying calculated pressure on the oil level. Implementation of other advanced methods of oil extraction is impaired by poor energy supply, and the slow fulfillment of the program of construction work."

There are similar problems at field No 3 where the head is R. Kuliyev. Last year the collective underproduced almost 10,000 T of oil. The situation has not been corrected even now, since build-up of the well is being delayed by the construction-installation administration of the association "Turkmenneft'." The wells that have been finished drilling have been idle for a long time. The oil workers placed a lot of hope on the start-up of the gas distribution battery No 4 "a" (GRB). But the builders let them down, thus closing the way to gas lift. Many gas lift wells remained on "hunger rations."

The impression is created that the association "Turkmenneft'" is not very concerned in the lag in construction. How else can one interpret this fact. Despite the fact that the volume of first-phase construction work for build-up in this year is almost a million rubles, the construction-installation administration of the association has only allocated R 450,000. Thus, an interruption in many important measures for intensifying extraction of oil and gas has been a priori predetermined. Even now the field Kotur-Tepe requires start-up of 35 new wells, switching 25 to progressive methods of extraction. The builders will only be able to fulfill half of the work. Thirty wells will remain "laid up."

An effective method of extracting oil using electric submergible pumps (ESP) is becoming widespread at the fields in the country. It has justified itself under conditions of Kotur-Tepe. Well No 146, for example, previously worked with interruptions because of a shortage of high pressure gas. At the suggestion of operator from section No 2 D. Analbayev, an ESP was installed in it. For 4 months now the artery has not needed repair, yielding the calculated quantity of oil. The advantage is first of all that the inter-repair period has increased 8-10-fold, secondly at least 15,000 m^3 of gas is saved every day at the well.

Many wells have already been switched to this method. But on the whole the situation is moving slowly. One of the reasons is the lack of a base for repair of the pumps. For services the gas workers have to turn to the association "Zapneft'," and this is unreliable and expensive. There is a reason to create such a base at the site. This is what the administration believes.

The problems indicated above have currently acquired acuteness primarily because the fields are experiencing a shortage of electricity. An especially serious situation has developed at the southeast section which receives electricity on a temporary plan. Accidents often occur on the line.

But this is not all. There are many wells in the section which need to be switched to advanced methods of mechanized extraction. But for the same reason it is impossible to do this. The chief reason is that there is no possibility of reconstructing the system of oil pumping which is currently slowing down the work of the oil extractors.

Why is this region so poor in energy resources? There is no unequivocal answer to this question. The customer, the association "Turkmenneft'" asserts that the contractor, the trust "Turkmenneftestroy" is refusing to do labor-intensive work. In particular, in the space of 2 years it has not started to use the planned-estimated documents for construction of a closed substation and intrafield power transmission lines on the southeast section of Kotur-Tepe. The contractor has his own arguments of this account. in order to increase the level of industrial construction standard facilities are primarily erected, in a block design. The oil workers suggest building them according to their own plans.

One can understand the builders of course, decrease in labor outlays is an important task. But let us look at what the block transformer substation is, for example, this is a large "box" on slides. Its "filling" is easily accessible to dust, water, and sun, all the undesirable external factors. If one

Taking into consideration the primitive nature of its plan which does not make it possible to ring it with a line, it becomes clear that this energy structure is not reliable help to the oil workers.

All the parties with enviable stubbornness, to the detriment of the situation, insist on their departmental interests. Would it not be better to develop an acceptable model of design by joint efforts, at the same time harmonizing the possibilities of some in its realization and demands of the others.

Let us again turn to the internal reserves. Deparaffinization of the lift pipes of the wells is still being poorly executed. This impairs the output of oil. It is true that now the deposits are being removed not by scrubbers, as previously, but by injecting a special liquid, gasoline. Its use in the hot form guarantees normal operation of the well for a month, considerably more than with the previous method. The technology of cleaning the pipes is violated quite often. Last year, reagent was pumped into the wells almost 2,000 times, with preheating in less than 200 cases. It is clear that the expected effectiveness was not obtained. The administration has not fully used such approved methods of deparaffinization as the use of warmed pipes. They have been shipped for 40 wells and installed only in 9.

Winter severely tests the oil workers. They do not always pass the test. Complications are more frequent at the gas lift wells, since preheating of pipes in the gas distributing battery section is done on an open fire. Often this fire goes out and the moistened gas freezes.

Research work at the wells is not high. The schedule for controlling their parameters is not fulfilled.

"Every day we have to determine formation pressure at the valves, stoping wells, and take other measurements at 3-4," relates the operator of field No 2 Kh. [illegible]. "But we do not always succeed at this, because of a shortage of transportation and the necessary instruments."

In addition at the fields new automatic group measuring units and other equipment are being started up. Despite this a number of wells have been operating "blindly" for a number of months without the necessary correction of the regime.

The collective of the NGDU "Leninneft'" is obliged to overcome the lagging, and to extract above the plan 1,000 t of oil this year. The boundaries are real. There are many unused reserves. Even now measures are being taken to solve the main task, stabilization of extraction of liquid fuel. Many wells are being [illegible] compressor gas lift, a more advanced method. The working gas will be fed into the depths at a high pressure and return without losses to the main gas pipeline. It is planned to inject about 9 million m3 of water into the beds. This will also promise a perceptible increase in oil.

Increase in the energy of the bed, improvement in the technology of oil extraction and the organization of labor: these can and must be done by the collective of the NGDU "Leninneft'." The efforts in this direction will be repaid tenfold.

9083
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GAS LIFT METHOD INCREASES WELL OUTPUT

Ashkhabad TURKMENSKAYA ISKRA in Russian 14 Feb 82 p 2

[Article by Z. Rzayev, co-worker of the Nebit-Dag television studio: "Outlook for the Gas Lift"]

> [Text] How can the rates of extraction of "black gold" be preserved and elevated in the future. Scientists of the institute "TurkmenNIPIneft'" are working on this problem. One of the verified methods for solving this task will be use of the gas lift.

At the end of the 1970's, rapid decrease in formation pressure occurred at the oil fields of Barsa-Gel'mes and Kotur-Tepe. Many wells ceased to gush. The field workers of West Turkmenistan needed to switch the wells to mechanized methods of operation, in particular, gas lift. The first gas distributing batteries were built. But, as the head of the laboratory of mechanized methods of extraction of the institute "TurkmenNIPIneft'" A. T. Guluyev relates, construction of the batteries went slowly. The number of wells which no longer gushed increased more rapidly.

The oil workers were forced to connect the "stronger" wells to the diminishing ones, and thus "fatten" them. This method was called the cluster gas lift. But its shortcomings were soon revealed. First, it required cumbersome stationary structures, and there was no time to wait for them. Second, it was economically inexpedient to erect expensive structures at unpromising fields. Scientists and developers gave to the institute designers the task of making optimal block units. Experimental batches were soon obtained which satisfied the requirements of the scientists.

Almost everyone, the workers of the institute, of the association "Turkmenneft'" of the NGDU [Oil and Gas Drilling Administration] had to work to transfer the cluster gas lifts to the standard plan. The system was improved. A basically new era began in fuel extraction.

In the 11th Five-Year Plan it is planned to bring 628 wells into the gas lift fund. This method will become the dominant, and at the Barsa-Gel'mes and Kotur-Tepe fields it will be 80 percent. This level will be maintained to 1990.

The field workers today are gradually switching from compressor-free to compressor method of gas lift. The latter is more economical and simple, and as applied to deep wells it is the only method. Of course, the effectiveness of extraction in this case depends a lot on gas output. The plans of the association "Turkmenneft'" and the institute "TurkmenNIPIneft'" therefore include tasks for further improvement in the technology of the compressor gas lift extraction, and in particular, for reduction of consumption of gas per ton of extracted oil.

The compressor station Kotur-Tepe will be reconstructed for the needs of the new technology. A large amount of work remains to be done to improve the efficiency of production, and increase the skill of the service personnel. Experimental-industrial tests are already underway on the latest types of equipment for series production and the equipment invented by the colleagues of the institute. In a word, the gas lift opens great potentialities for the field workers.

The introduction of the innovation, of course, is linked with many unresolved scientific problems. The institute collective is quite capable of solving these problems with high skill and economically, and rendering real help to the field workers.

9035
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BRIEFS

GAS PIPELINE EQUIPMENT--Tests are being completed of the country's most powerful 25-megawatt gas pumping unit at the gas compressor station in Novgorod. It was manufactured in the Leningrad production association "Nevskiy zavod" imeni V. I. Lenin and consists of a gas turbine motor of a new generation and highly productive two-stage centrifugal compressor. The GPA-25 units will guarantee transporting of large streams of natural gas from West Siberia to the European sector of the Soviet Union on a system of 5 gas pipelines 1,420 mm in diameter at pressure of 75-100 atmospheres. The main samples of the unit have successfully passed testing and finishing. Some Western firms have shown an interest in cooperation to produce GPA-25 units. Their specialists have become acquainted at the "Nevskiy zavod" with the design, production and testing results and have become convinced of the high technical-economic indicators of the units. The firms have suggested cooperation to produce them. The association "Nevskiy zavod" will begin series manufacture of the new gas pumping unit in the near future. [Text] [Moscow KRASNAYA ZVEZDA in Russian 7 Feb 82 p 1] 9035

GAS TO GEORGIA--The collective of the Kazi-Magomediskiy line-production administration of the maingas pipeline of the association "Aztransgaz" is working precisely and smoothly. Since the beginning of the year, over 2 million m^3 of gas have already been pumped to the fraternal republics of the Transcaucasus. Control over the main equipment and its preventive maintenance have been carefully set up here for continuous operation of the main gas pipeline during the winter. Recently, the workers of the administration fulfilled repair-preventive maintenance work on two gas pumping units in compressed schedules. Because of the assiduous and conscientious attitude to work of the station workers, the coefficient of readiness of the equipment has been brought to one. This practically excludes interruptions in gas supply to the industrial enterprises of Armenia and Georgia. [Text] [Baku VYSHKA in Russian 21 Feb 82 p 4] [Article by O. Akperov, machine operator of the Kazi-Magomedskiy line-production administration of main gas pipelines] 9035

OIL DISCOVERED--The low ridges of Malaya Kabarda in that place where the Terek steppe turns back toward north Osetiya have treasures that have been hidden until a certain time. A powerful gusher of excellent oil has been obtained from a depth of 5,000 m. The discovery of a new field is always a great event. Well No 19 in the desert area of Arak-Dalatarek is an event that is doubly remarkable because this is the first oil in Kabardino-Balkariya. One of the best brigades from the association "Grozneft'" from neighboring Checheno-Ingushetiya drilled the well here. It was planned that the prospectors would take 1,167 days to reach the rated depth of 5,400 m. They were 58 days ahead of the calendar and during the drilling time conserved R 913,000. "The solidarity of the multinational collective is what helped us in this long and difficult watch," says the head of No 19 A. Z. Galayev. "The drillers of Checheno-Ingushetiya dedicate their success to the 60th anniversary of the formation of the USSR." [Text] [Moscow SOVETSKAYA ROSSIYA in Russian 24 Jan 82 p 1] [Article by A. Podol'skiy, Kabardino-Balkarskaya ASSR] 9035

TURKMEN GAS FIELD--A new gas field of Erdekli in West Turkmeniya has been connected to the trunkline Central Asia-center of the country. [Text] [Moscow PRAVDA in Russian 2 Feb 82 p 2] 9035

PIPELINE WELDING BEGINS--The first sections of the Urengoy-Novopskov pipeline have been welded. This underground trunkline will annually supply 30 billion m^3 of gas to the European sector of the country. The Siberian workers have decided to lay the Tyumen' section of the line (its length is 850 km) a month earlier than stipulated by the plan. [Text] [Minsk SEL'SKAYA ZHIZN' in Russian [illegible] Jan 82 p 1] 9035

GAS FLOWS--Gas of Urengoy has arrived at Kursk on a pipeline laid from the city of Yelets in the Lipetskaya Oblast. Natural gas has been supplied to south Karakallakii on the main pipeline Turtkul'-Beruni-Ellikkala laid in western Kyzylkumy. It is 150 km long. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 8, Feb 82 p 3] 9035

NEW GAS FIELD--Construction has been completed of the new gas field Erdekli in West Turkmenistan. It has been connected to the Central Asia-center of the country. The second phase of the Shurtan gas complex in Uzbekistan has been opened. The new facilities will double the extraction and pumping of gas from 4 to 8 billion m^3 per year. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No [illegible] Feb 82 p 3] 9035

GAS PLAN FULFILLMENT--The workers of the gas industry have fulfilled the 1981 plan for gas extraction ahead of schedule. Increase in extraction as compared to 1980 exceeds 29 billion m^3 of gas. The last butt-joint on the main section at the Urengoy-Petrovsk gas pipeline has been welded ahead of schedule. The route which is 850 km long is ready to receive natural gas from the polar fields. The first million cubic meters of natural gas arrived from the underground warehouses of the Azov Sea at the Crimean pipelines. Specialists of the production association "Chernomorneftegazprom" have begun its industrial extraction. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 1 Jan 82 p 3] 9035

NEW DEVELOPMENTS--A powerful influx of gas, a half million cubic meters per day, has been obtained from the first exploratory well drilled at the new field Dzharkuduk in South Uzbekistan. The second unit "Pareks" has begun to produce.

It was built in cooperation with the engineers from the GDR. With its start-up, the Mozyrskiy oil refinery has completed transition to a progressive and economical technology of production, based on deeper purification of oil. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 6, Feb 82 p 3] 9035

OIL REFINING--The second production unit of the plant for refining casing-head oil gas in Surgut has started up. The annual output of highly automated gas refineries at the oil fields of Khanty-Mansiyskiy Autonomous Okrug has exceeded 18 billion m³ with its start-up. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 6, Feb 82 p 3] 9035

NEW NATURAL GAS--Natural gas of another field in the Karakumy, Eroekli, has been supplied to the Central Asia-center of the country trunkline. The republic gas workers have to increase extraction of "blue fuel" in the 11th Five-Year Plan by 12 billion m³. The field workers of the production association "Shatlykgazdobycha" are advancing in the competition for a worthy meeting of the 60th anniversary of the USSR. They provide a daily output to the main pipelines of 1.5 million m³ of fuel in addition to the assignment. [Text] [Moscow IZVESTIYA in Russian 11 Feb 82 p 1] [Article by V. Gavrichkin, in-house correspondent of IZVESTIYA] 9035

GAS-TURBINE POWER PLANT--The first phase of the Novourengoy gas turbine power plant with output of 24 megawatts has started up. It was erected by the collectives of the trust Urengoygazpromstroy and its subcontracting organizations with the participation from the Novosibirsk trust of mobile power plants. Construction of the plant is continuing. It is planned to start up the second phase on the 112th anniversary of the birthday of V. I. Lenin. [Text] [Moscow STROITEL'NAYA GAZETA in Russian 19 Feb 82 p 2] 9035

NEW OIL--Kabardino-Balkariya has received "its own" oil. It was produced by well No 10 at the Arak-Dalaterek field from a depth of 5,000 m. The leading brigade of A. Galayev in the association "Grozneft'" did the drilling. It saved R 315,000 during the work. [Text] [Moscow IZVESTIYA in Russian 8 Feb 82 p 2] [Article by A. Kazikhanov] 9035

YAKUTIYA PIPELINE--Transporting of pipes welded into 36-meter "lengths" has begun on the winter roads of West Yakutiya. They are intended for the first gas pipeline of this area. Extensive deposits of fuel gas have been found by geologists in the basin of the river Ulakhan-Botuobuy, the right tributary of the Vilyuy. Reserves of the natural underground storehouse are such that they are sufficient for complete satisfaction of the daily and production needs of the rapidly developing capital of diamond extractors, the city of Mirniy for a century. It has been decided to lay a pipeline about 200 km long for continuous supply of blue fuel to the city. The mobile column of the trust "Yakutgazstroy" is working on the route of the future gas pipeline. A large quantity of first-phase technological freight delivered on ships in summer navigation has already been concentrated on the outskirts of the city of Lensk. It has a major mechanized river port and is linked to Mirniy by a broad highway which is open year round. Not far away, Shaman-Gora, a settlement of builders has been built. A cafeteria, store and other facilities of social-cultural and daily life adjoin comfortable multiple-apartment buildings and dormitories. Special racks for automatic welding of pipes have been built with good quality. Veteran A. Mukhin distinguished himself in this operation which requires irreproachable accuracy. The pipes are welded into 36-meter "lengths" and are being shipped to the laying site. The brigade of welders A. Stadnik is working excellently here. It succeeds in fulfilling almost one-third more than the assignment every day. About 35 kilometers of gas pipeline have already been installed. [Text] [Moscow TRUD in Russian 7 Feb 82 p 1] [Article by V. Nikolayev] 9035

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GENERAL

ENERGY PROBLEMS OF FAR NORTH REMAIN UNRESOLVED

Moscow SOVETSKAYA ROSSIYA in Russian 13 Feb 82 p 1

[Article by A. Klimenko, in-house correspondent of the newspaper for the Magadanskaya and Kamchatskaya Oblasts: "Energy of the Northern Kray"]

[Text] Tundra and white silence, these are concepts which have been inseparably interlinked for centuries, making the very idea of economic development of the Chukotka-Kolym region almost utopic. However, our time has fundamentally altered the previous viewpoints. The energy of the first atomic reactor in the Arctic, the fires of powerful mining-enriching kombinats, rock dumps of mines and pyramids of drilling units: these are not simply unique visiting cards of the kray, but visible symbols of the wealth and great potentialities of the northeast outskirts of Russia. The region provides the national economy with gold, silver and tin. How many underground storehouses are still hidden from us! Characteristic features of the geological map of the region are the number of white spots which are incomparably more than on the "mainland," and the volume which is much more impressive than anywhere else of still untapped, local resources not involved in the economic turnover.

Very favorable outlooks are afforded for the northeast region in this five-year plan. The Main Directions for Economic and Social Development of the USSR adopted at the 26th CPSU Congress in particular stipulate accelerated increase in the economic potential of the eastern regions, implementation of major work to develop their natural resources and develop the fuel-energy and raw material bases of Siberia. The development of a program of comprehensive economic and social development of the Magadanskaya Oblast aimed at successive deepening of specialization of the northeast in the national division of labor, comprehensive development and use of the natural resources here has become an important landmark on this path. According to this program, formation of new industrial complexes in the polar and subpolar regions of the Chukotskiy Autonomous Okrug, expansion of production scales in the previously developed regions of Kolyma, and further exploration of oil and gas have been outlined. Strengthening of the in-house fuel and energy base is the current guarantee for success in each of these directions.

This condition has been dictated by the rapid rise in mining enterprises, the rapid construction rates, and expansion of the transportation links. Is it really normal that, having major reserves of coal, the Magadanskaya Oblast is experiencing a shortage of fuel for energy purposes? Marine transport alone currently ships to the oblast center about a half million tons of Urgal' coal, and in future years because of expansion of the Magadan TETs, the volume of shipments must increase by more than double. The rated output of Chukotka mine "Beringovskaya," the largest in the oblast, has been covered alreadly almost 3-fold. Where is the output?

"It is necessary," says the mine director I. P. Zvyagintsev, "to immediately begin reconstruction of 'Beringovskaya'. This would permit an elevation in coal extraction to 1 million T. It seems that the association "Severovostokugol'" needs to raise the question of reconstruction more persistently before the ministry."

The annual coal extraction at "Beringovskaya" averages 600,000 T, but could increase by 400,000 T. Almost exactly as much of it is delivered today, detracting tens of ships, and wasting enormous resources on transport. This is graphic arithmetic. Now exploration of new coal beds is actively underway. This affords a new outlook for production of an additional hundreds of thousands of tons of inexpensive coal through reconstruction and technical re-equipping.

It is impossible to say that the oblast workers have not advanced questions associated with more complete use of local resources. Nevertheless, nothing comes of the discussions on this topic, and we have heard the advice: "the problem of the local resources of course is very acute, only write more accurately that the situation is delicate. This would not harm the publication. As a minimum, we can 'constrict' the channels of supply, but without this, it is quite impossible!"

It is easy to see elementary economic dependence rooted in years of references to extreme conditions behind this logic. The matter reaches curiosity. At the Beringovskiy Rayon party conference the following fact was cited: the power plant at the coal mine operates on diesel fuel which is brought in by sea. How many similar examples of wastefulness can be accumulated for the northeast!

In a conversation about a wiser, more complete use of local fuel and energy resources it is impossible to bypass the position of the scientists. The northeast comprehensive scientific research institute believes that coal of only one section of the Lankovskiy field where balance reserves have already been computed, is sufficient to satisfy the needs of Magadanskaya Oblast for more than 20 years. Comprehensive use of local coal from the northeast would reduce the transportation expenditures which almost double the cost of each supplied ton of petroleum products. However, according to the general plan for development of the coal industry, the construction of the open pit "Lankovskiy-1" is planned for 1991-1996. At the same time, it is planned to complete construction of the Lankovskaya GRES earlier. What type of fuel will the plant operate on? The USSR Gosplan and the USSR Ministry of the Coal Industry should clearly answer this question.

It is necessary to examine another, no less important fuel and energy problem on a fairly high level. A hypothesis regarding oil content of the northeast appeared already in the prewar years. However, the specialists then equipped only with a hammer and a compass could provide very approximate answers. The advances of domestic oil geology in the postwar time made it possible to return to searches for oil and gas on a much more solid scientific basis, with regard for the laws governing the formation and arrangement of promising fields. Reserves of "black gold" were found precisely on the peripheral sections of the grand Pacific Ocean hollow (southeast Chukotka belongs to them) in a whole series of countries, including ours (on Sakhalin Island for example). The largest expedition was set up on the basis of two small parties in Chukotka.

Over two dozen wells have been drilled in the last decade at Chukotka. Indirect prerequisites have been found in every third well, and direct proof of the presence of oil in every fifth. One well has already produced the sought-for result.

The RSFSR Ministry of Geology refers to the search studies in the northeast, in particular in Chukotka, at least evasively: they do not plan to halt this work, and they do not strive to activate it. The position of the management group looks roughly like this: "find oil and we will produce the capital investments." With the recently set rates of drilling, searches at Chukotka can extend for an indefinitely long time. Does this not disturb the leaders of the RSFSR Ministry of Geology?

I would like to especially talk about one important energy reserve. Thermal sources are no longer an exotic idea today, nor a crane in the sky. The hot steam of the Kamchatka fields, the Mutnovstiy, Paratunskiy and Pauzhetskiy, is already heating greenhouses and settlements. There are truly unique fields on the peninsula: at Nizhne-Kochelevskiy, for example, water temperature over 250 degrees has been recorded. Similar underground "steamers" can become a reliable base in the near future for creating major geothermal plants in the region. The skilful use of the most promising fields, according to the calculations of the specialists, would permit the oblast to conserve about 5 million T of conventional fuel per year. Why are these generous energy warehouses not being developed since this is required in the interests of further development of the oblast national economy? The main obstacle is the fact that the thermal resources do not have a single master. It appears that the time has come to create a powerful scientific-production association which would concentrate in its hands all the geological exploration work, extraction of thermal waters and operation of the new thermal complexes.

To place the reserves at the service of society is the most important economic and political task at the current stage. This is stressed in the decree of the CPSU Central Committee of the USSR Council of Ministers "On Intensifying Work for Conservation and Efficient Use of Raw Material, Fuel-Energy and Other Material Resources." This situation must become the program of action for all those participating in the economic construction of the northeast. Nature has really gifted with resources this distant and harsh kray. It is necessary to force them to work with the highest output.

9035
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GENERAL

OTHER BENEFITS OF EKIBASTUZ COAL BASIN LISTED

Moscow GUDOK in Russian 3 Feb 82 p 4

[Article by N. Maslov, correspondent of APN: "Ekibastuz: Virgin Soil of the Basin"]

[Text] The Pavlodar Irtysh region has been called the kray of developed machine construction, power engineering, metallurgy, and petrochemistry. Based on local and nearby mineral fields, a major aluminum plant, several mining administrations which manufacture concentrates of lead, zinc and other metals are operating, and a mining-enrichment kombinat for extraction of copper and molybdenum is under construction. The first phase of a powerful oil refinery was recently started up and a second is under construction.

The Pavlodar Irtysh region today provides one-tenth of the coal extracted in the USSR, one-sixth of the ferro-alloys, andone-twelfth of the tractors. The region has already become one of the leaders and the most dynamic in the country for economic potential. The volume of realization of industrial products is annually rising here almost twice as fast as the average for the Soviet Union.

What caused such a rapid rise in the economy of a one-time backward kray? What attracted the Soviet people to the desert, harsh steppes of North Kazakhstan? The reason for everything is the rich depths of the earth here. For a long time they have irrepressibly enticed man, but they have been successfully reached only now. Salt and copper, silver and gold, limestone and molybdenum, raw material for the aluminum industry: this is a far from complete list of the underground warehouses of the Irtysh region. The chief of them is fuel for thermal power plants.

Major deposits of coal of the Ekibastuz and the Maykubenskiy fields which according to the estimates of the geologists comprise about 14 billion T have been explored in detail and are already being worked not far from Pavlodar. The coal lies close to the surface in thick beds 100-180 m thick. It is being extracted by the open-pit method and is the least expensive coal in the USSR.

Even now 40-50 railroad cars of coal are sent from here every day to different ends of the country. Twenty power plants in the Urals, Siberia and Kazakhstan with total output of 15 million kW are operating on Ekibastuz fuel. They generate more electricity than the entire country before the Great Patriotic War.

In other regions, however, it is more advantageous to transfer the electricity than to ship the coal. Therefore a decision was made to create a local GRES cascade made of 5 power plants with total output of 20 million kW. The first [illegible] power units of the Ekibastuz GRES-1 of 500,000 kW each are already operating and producing a current.

A unique fuel-energy complex is being born, and together with it, difficult problems of environmental protection are being raised. For example, where can the quantity of fresh water required by the plants be taken from? How can the ash problem be solved? The Ekibastuz coal contains up to 40 and more percent of mineral substances. Up to 30-50 million T of ash (about 4,000 T per hour) will be dumped daily during the operation of the four Ekibastuz GRES's. The questions which Ekibastuz raises have to be solved in the favor of nature, and in the final analysis, of man himself.

A Center for Study and Control of Environmental Pollution has been set up in Kazakhstan. Not a single industrial enterprise can be set up in a republic without its consent, not a single construction project can be approved without its inclusion of the necessary environmental protection measures. This occurred during the creation of a draft for the Ekibastuz GRES. Where the structures of the first Ekibastuz power plant are now being erected, there used to be ground white from salt, and nearby heavy waves of the dead saline Zhengel'da Lake splashed. Now this region has been converted into an oasis. The power builders pumped the saline water from the lake, deepened the bottom and filled the depression with fresh water taken from the Irtysh. They pumped it out again and filled it again. They repeated this three times. At the same time the coastal saline soils were washed. Now the water in the lake has become fresh and serves as a coolant for the GRES turbines in a closed cycle.

The shores of the reservoir are being built up for a municipal recreation zone: trees are being planted, beaches are being built and 5,000 summer areas are being set aside for the local society of amateur gardeners. The reservoir is being populated with fish under the observation of the ichthyologists: the white amur, tolstolobik, carp and trout. With time, the miners and power engineers will have enough fresh fish for the table.

In a word, everything is being done as planned not only to prevent damage to nature, but also to improve these harsh desert places.

The problem of ash has also been successfully resolved. Dried up lake Karasor is located 22 kilometers from the GRES. The giant hollow is able to receive [illegible] billion m^3 of ash. It would require 50 years to fill it with wastes from all the Ekibastuz GRES's. The level of the dried up lake is 70-80 m below the platform of the plants. This made it possible to use a gravity flow system of hydraulic ash removal: a mixture of water and ash flows by gravity into the ash dump on pipes 1,200 mm in diameter. To prevent spraying, powerful hydraulic dredges wash it off with loam. The system of transport and storage of ash is thus fairly economical and harmless for the environment and man.

But this is not all. Studies have shown that ash is not simply a waste, but a valuable mineral raw material for the aluminum and cement industry. A significant part of the ash is aluminum oxide, an important raw material for the currently active Pavlodar aluminum plant. The ash has many rare metals. Production of products from "wastes" may be less expensive than from raw material especially extracted for this purpose.

Over 60 scientific research institutes, planning organizations, production associations and enterprises in the country are currently involved in the problem of using the mineral part of the Ekibastuz coal basin. A method has already been developed for comprehensive reprocessing of ash into alumina (the original raw material for production of metal aluminum) and cement. The Kazakhstan scientists have suggested an original method for extracting the metal aluminum directly from the ash.

There are also a number of other works to use the mineral part of the basin to produce gallium, energy-accumulating substances, construction ceramics, light heat-resistant concrete, porous fillers and other construction materials. The problem of wastes will be solved in time. The currently created Pavlodar-Ekibastuz territorial-production complex includes not only powerful energy-intensive industries, but also enterprises for the comprehensive use of raw material. This will also serve as a centralized solution to the problem of environmental protection.

9025
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GENERAL

TRANSBAYKAL POWER ENGINEERING POTENTIALITIES REVIEWED

State of Power Engineering Facilities

Moscow PRAVDA in Russian 9 Feb 82 p 2

[Article by B. Vtorushin, V. Orlov, special correspondents of PRAVDA: "Power Engineering of the Transbaykal"]

> [Text] "Start up the first units at the Kharanorskaya GRES, and complete construction of the Gusinoozersk GRES." (from the Main Directions for Economic and Social Development of the USSR for 1981-1985 and for the Period to 1990).

1. In the Zone of the Great Trunkline

The current year at the construction of the north-Muyskiy tunnel began with a joyful event, the construction of the largest underground railroad corridor on the Baykal-Amur Trunkline began the assigned rhythm. The success in addition to the high skill of the people was predetermined by the fact that energy of the Ust'-Ilim GES came hundreds of kilometers through the taiga and mountains to the north-Muyskiy ridge. It made the trunkline builders stronger and more confident.

Proper due should be given to the creators of the energy bridge. It had to be laid through places where until this time man had rarely stepped. Nevertheless, the electrical river, after by-passing the north-Muyskiy ridge, approached Vitim and went further to the north Transbaykal, where it will break through the last tunnel under Kodar and lay the "golden" link which symbolizes the completion of the construction of the century.

The northern Transsiberian pipeline has given the Transbaykal a special place on the economic map of the country. Geologists recently discovered here many rich underground warehouses. Take, for example, the asbestos of the Molodezhnoye field. The "mountain flax" here in its qualities is one of the best in the world. Deposits of lead and zinc have been discovered in the basin of the Kholodnaya River, and copper reserves in Udokan. A major industry can be set up on this basis. The depths of the Transbaykal hide reserves of iron and coal, valuable and rare metals, marble and ornamental stone, and diverse construction materials.

The use of these resources is already on the agenda. The 26th CPSU Congress set specific tasks for the economic development of the zone which stretches towards BAM [Baykal-Amur Trunkline]. Electrification must become the basis of their resolution.

All the power engineering in the Transbaykal until recently was based on small dispersed power plants. It was difficult under these conditions to speak of creating a major industry here, intensifying agriculture and developing transportation. The situation has now fundamentally changed. In Buryatiya alone the energy output in the last two five-year plans has increased five-fold. Two thousand small diesel stations were closed during this time.

"Now 99 percent of all the consumers in the republic receive electricity from the GRES and TETs," we were told by the manager of "Buryatenergo" G. Borisov. "Not only major enterprises and populated areas have been electrified, but also the shepherd stations."

Significant work has been done by the power engineers of the Chitinskaya Oblast. Only a few of the most remote regions which are cut off by mountain ridges of difficult access do not have state electricity today. A unified energy system has been set up in the oblast. A lot has been done in this direction in the village. The rates of rural electrification in the Transbaykal are higher than the all-union. In Buryatiya alone, about a thousand kilometers of power lines are introduced annually for the villagers.

The Transbaykal has been merged into the unified energy ring of the country. Power transmission lines cross its steppe and taiga expanses. The electrical river runs on one of them to the Mongolian city of Barkhan. It is praised as the line of friendship. Electrification of the Transbaykal railroad has begun. The surveyors have already plotted on the maps power transmission lines which will be laid to the north, to BAM.

This scope of work has become possible because of the creation of a reliable energy base in the region. Its first-born is the Chitinskaya GRES which produced current in 1965. Today six blocks provide heat and power at the station. The Gusinoozersk GRES has become a child of the 10th Five-Year Plan. The output of its 4 units is 840,000 kW.

The cities have received reliable heat. It supplies over two-thirds of the enterprises of Chita and Ulan-Ude. The existence of about 500 small boiler houses ceased with the start-up of the TETs. The air became cleaner and healthier.

But this is only the beginning of the large power engineering plan of the Transbaykal. Developing industry, development of the BAM zone require new supplies of electricity. Taking into consideration the needs of railroad transportation, mining industry, machine construction and agriculture it is necessary to increase energy generation several times.

The Gusinoozersk GRES is being expanded. Construction of new units has begun here. In the southern Chitinskaya Oblast, construction of the Kharanorskaya

GRES has evolved. It is planned to make a more powerful Chita GRES in the current five-year plan, and to start up the first blocks of the Ulan-Ude TETs-2.

Variants for constructing hydroelectric power plants in the Transbaykal are currently being studied. Technical and economic substantiation is being developed for the Mokskaya GES which should be erected on the Vitim River. The planners together with the Chita power engineers have also visited the Shilka River which has significant hydrological resources.

"The Shilka GES, if a decision is made to build it," said the first secretary of the Chita party obkom M. Matafonov, "will be one of the most economical in the eastern section of the country."

It seems that the suggestion of the Chita residents deserves the attention of the USSR Ministry of Power and Electrification and the planning organs. The site of the future hydroelectric plant has been successfully selected. It is located in direct proximity to the major railroad station of Mogocha. The GES reservoir will not affect agricultural crops in populated areas. Its power may be used in Udokan and for further electrification of the Transsiberian trunkline. The Shilka GES would become a link which will help to connect up the electric streams of the Transbaykal stations and the GES of the Angaro-Yenisey cascade.

What is the situation at the facilities of today's power engineering?

The panorama of construction of Kharanorskaya GRES is clearly visible from the high cone-shaped hill which the road ascends. The framework of the start-up heating boiler plant rises on the shore of the Onon River. Somewhat to the side, the contour of the future settlement of power engineers, Yasnogorsk has been clearly designated. The builders have performed work of R 20 million in 6 years. In order to implement the target task for the remaining 3 years, it is necessary to create facilities costing another R 100 million. The existing construction administration is not capable of this. There are several reasons. One of the chief reasons is the acute shortage of personnel. There are many who desire to come, but there are no places for them. There is not enough housing even for those who have been working here for a long time already. Planning of the plant is lagging.

They say that increase in the rates of work is being delayed by insufficient financing of the construction site. This is actually so. But the internal reserves are also being poorly utilized. Last summer the office of the Chita CPSU obkom examined the course of construction and made an important decision. However, many points of it have remained unfulfilled. In particular, the oblast organization and departments were directed to provide the GRES with local construction materials. But the demand for brick, claydite gravel, and lumber were satisfied by less than half. The builders therefore had to resort to all kinds of tricks in order to open residential houses or build kindergartens.

The creators of the Gusinoozersk GRES complain of insufficient financing and a shortage of housing and social-cultural-general facilities. This collective in the 11th Five-Year Plan has to put into operation another two energy units, that is, it is necessary to fulfill work costing R 25-30 million annually. It is planned to allocate only R 8 million this year.

The problems of the Transbaykal power engineers would be solved more simply if the USSR Ministry of Power and Electrification had some construction industry here. But it does not just as at many other facilities. This ministry has been repeatedly criticized in the press for this. Parts of houses are shipped 4,000 km to Yasnorgorsk from the Urals. They are delivered to Gusinoozersk from the Krasnoyarskiy Kray. The industrial reinforced concrete also has to traverse this path. Part of the structural designs malfunction during transporting.

Several years ago the leaders of the sector decided to erect in Chita a plant for construction designs which would provide precast reinforced concrete and housing parts for all the Transbaykal construction sites of the Ministry of Power and Electrification. Its first phase was to produce 50,000 m^2 of housing per year and 30,000 m^3 of industrial reinforced concrete. The cost of the plant was R 15 million. It should produce products this year. There is currently no more important facility in the construction industry of the Chitinskaya Oblast than this one. We visited it. However, we did not see a prestart-up intensity nor even normal labor animation. As it turned out, the construction administration of the Chita GRES which is building the construction kombinat has not fulfilled the plan even once. Quite recently this collective was capable of doing volumes of work for R 10 and more millions per year. What happened?

This small kombinat which represents a single complex and which is located on one area had three customers "Khabarovskanergo," "Chitaenergo" and the trust "Yuzhuralenergostroy." Each of them financed the construction of its own shop. In fact, no one was responsible. Too many cooks spoil the broth.

Under these conditions the Glavvostokenergstroy evidently had to take upon itself coordination of the work. But special concern for the construction site was not seen on the part of the central board. "The head of the central board V. Kondrat'yev came to Chita last year," the chief engineer of the administration A. Filatov relates. "He gave his word to allocate to us a thousand cubic meters of wall panels and 600 tons of metal constructions. But we have not received what he promised."

A serious obstacle to the construction is the separation of the management of the trust "Yuzhuralenergostroy" located in Chelyabinsk from its Chita subdivisions. They are separated by over 4,000 kilometers. It sometimes takes weeks to make the trip for different agreements.

In our opinion, the Chita CPSU obkom is not paying sufficient attention to the construction site. There is poor control over erection of the construction industry base. There has not been sufficient exactingness of the customers and the contractor.

The absence of a construction industry base significantly delays the development of the Transbaykal power engineering. But there is another no less serious problem. We had to encounter this paradox: with a general shortage of

Electricity at the Gusinoozersk GRES, only two out of the four units were operating, and not at full power. There was a shortage of coal.

The Ulan-Ude TETs, the Chita GRES, and other power plants underproduced power as a result of this. But the already confirmed coal reserve in the Transbaykal comprises several billions of tons.

What is the reason for this situation? We will discuss this in the next correspondence.

Coal Situation Examined

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[Article by S. Vtorushin, V. Orlov, special correspondents of PRAVDA: "Power Engineering of the Transbaykal"]

[Text] 1. Who is Entering the Storehouses?

The Daurskaya steppe bristles with red grass in winter. There is almost no snow and the thermometer column is literally frozen at the minus 40 mark. The land is frozen together, and has become like a rock. But only 20 meters from its surface there is a powerful source of heat, coal deposits.

It is visible from the viewing platform of the Kharanorskiy open pit how the excavators are simultaneously loading three railroad cars. Freed of the layer of ground which covers it from the top, the mass of coal breathes heat. The bed descends downward in a shear wall almost for 50 meters.

The Kharanorskoye field of lignite was discovered back in 1897 by an expedition of the famous geologist and researcher of East Siberia, Academician V. Obruchev. However this resource had to wait for its hour for 60 years. The industrial working of the bed only began in 1957. Until this time the coal here did not find major consumers.

Today the Kharanorskiy open pit is the most powerful coal extracting enterprise in the Transbaykal. It supplies fuel not only to the Chita and Krasnokamensk GRES, but also the power engineering enterprises of the Far East. The miners extracted 6.5 million T of coal last year, and this year this number will be increased by 500,000 T.

The Kharanorskiy coal whose reserves comprise almost 2 billion T has many advantages. It contains only 16 percent ash, its thick beds are uniform, and it does not require enrichment. The mining-geological conditions are also suitable for working the fields.

The fame of the coal here has spread far beyond the limits of the Transbaykal in recent years. Many experts of coal extraction are working at the Kharanorskiy open pit. Last year, for example, the high title of USSR State Prize laureate was awarded to excavator machine operator N. Petrov and machine operator-diesel engine instructor B. Kharchevnikov for leading indicators in work. Here there is a club of "millionaires" which includes brigades who have been able to work a million and more cubic meters of rock during the year. The club is headed by bearer of the Order of Lenin, Communist A. Mayborod, the first to cross the million-ton border. Brigade foreman A. Tarasenko has twice taken lagging collectives and made them into leaders. The miners refer very warmly to their leader, director of the open pit A. Voronov. This man has given almost 20 years to the enterprise, and he deserves a lot of credit for the general success.

A musical school, Palace of Pioneers has been organized in the settlement of the miners by in-house forces, an excellent dispensary has been built in which 500 miners last year alone rested and recovered their health. There are also auxiliary services here with a pig sty and greenhouses.

All of this could not help but influence the results of work. The output of one worker in the open pit has reached 700 T of coal per year, one of the best indicators in the sector. Here is the country's lowest net cost of coal. It is only R 1.38 per ton.

Kharanorskiy open pit is the best, but not the only coal extracting enterprise in the Transbaykal. In addition the mines "Vostochnaya" and "Bukachacha," the open pit Kholbol'dzhinskiy and other enterprises are also active. The depths of the region are exceptionally rich in "fuel rock." In addition to Chara which is the largest station of BAM, we were shown thick beds of anthracite which emerge to the surface. There is no doubt that they are of great interest for comprehensive development of the Udokan industrial region. The explored reserves of coking coal here total 2 billion T.

A major coal region which has been called Tugnuyskiy, has been found next to the Transsiberian trunkline, on the border between the Chitinskaya Oblast and Buryatiya. This fuel has high characteristics and the beds can be worked by the open-pit method. Extraction here should exceed 10 million T per year.

The geologists discovered the Tataurovskoye field not far from Chita. Construction of an open pit has already begun here. Fuel deposits have also been discovered in the Yeravninskiy, Selenginskiy, and Kurumkanskiy Rayons, and in the Tunkinskiy, Torskiy, Verkhne-Angara, and Muyskiy hollows. The coal reserves here are such that they will permit extraction for a century of a minimum of 40-50 million T of fuel per year.

At the same time, about 3 million T of coal were imported to the Transbaykal from other regions last year alone. What is the reason for this situation?

We visited the Kholbol'dzhinskiy open pit, the fuel supplier for the Gusinoozersk GRES. The representative of two ministries, Ministry of Power and Electrification and Ministry of the Coal Industry, came here on the same day. His main purpose was to "squeeze" out of the open pit if only 100,000 T of coal above what the miners had promised.

The open pit was opened in 1978, but until now has not reached the planned output. Its misfortunes started from the plan itself. Heavy-freight dump trucks were stipulated for the open pit, but our industry has not set up their manufacture. The volume of stripping operations was also erroneously defined. It was required to haul not 6.2 m^3 of stripping per ton of coal as outlined in the plan, but a cubic meter more. As a result, the annual volume of stripping operations rose from 18 million m^3 to 28 million m^3. In order to cope with it, a large quantity of additional equipment and people is required. This means that it is necessary to expand the workshops, heated stations for the transport equipment, construction of additional housing and social-cultural facilities.

There is none of this yet. The open pit collective is constantly undersupplying coal to the Gusinoozersk GRES and thus interrupts the normal operation of the entire Transbaykal energy system. The planners should be made a little more responsible so that in the future they will not permit such blunders.

It is impossible to say that the local party and soviet agencies are not guilty for these problems. The Chita oblast organizations have repeatedly appealed to the USSR Ministry of the Coal Industry with a request to examine questions of further increase in fuel extraction in the Transbaykal. In this case especial concern was shown for the need for the most rapid construction of a second open pit at the Kharanorskiy field. Now the entire increase in output at it is only due to intensified working of the coal field in the existing open pit. This is not sufficient to provide for the needs of the Kharanorskaya GRES which uses the coal.

The Tataurovskoye field is being slowly developed. The collective of the mine "Vostochnaya," the oldest coal extracting enterprise in the Transbaykal should be rebased at this field. According to the plan, the Tataurovskiy open pit should yield over a half million tons of fuel already this year. But work at it is slow, and is only done by the miners themselves.

"We believe," says the secretary of the "Vostochnaya" mine party committee M. Gan'shin, "that it is time to take the most decisive measures to accelerate working of the Tataurovskoye field. There is only one way, to more rapidly erect a new settlement of miners at the site with the necessary housing fund and social-cultural-general facilities."

The shortage of housing and social-cultural-general facilities is one of the painful problems of the Transbaykal coal miners. Even at the Kharanorskiy open pit, the miners complain that for several years they have not been able to be included in the plan for contract work of housing.

It is impossible to be silent about the situation of the local agencies of authority. Several years ago in the Borzinskiy Rayon, where the pit is located, there was a large construction administration. It did a lot of good for the coal workers. However, with the silent agreement of the Borzinskiy party gorkom and the Chita CPSU Oblast Committee, the administration was eliminated. The mobile mechanized column of Glavchitapromstroy that remains here does not even fulfill half of the work necessary for the coal miners.

The situation is no better in other places. Expansion of the Gusinoozersk GRES is closely linked to the development of the Tugnuyskoye coal field. The power engineers should receive fuel for new units of the station which will be completed by the end of the five-year plan precisely from this field. The station is being built, but they have not yet started to build the open pit.

"We are concerned by the position of the USSR Ministry of the Coal Industry," says deputy chairman of the Buryatskaya ASSR Council of Ministers I. Darzhayev. "A stream of fuel should come from the field already at the end of 1984, but not even a peg has been driven there. In order to set up extraction it is necessary to create a collective, build a settlement and production base."

There is no harmonious system of personnel training in the Transbaykal. The leaders of the local enterprises are engaged in this themselves, each based on their own potentialities and measure of responsibility for this important matter. In Kharanor, for example, a young shift of miners has been trained for a number of years at the secondary school. This does not happen in other places.

Omissions in capital construction, timely creation of new facilities, training of personnel would be significantly fewer if the Transbaykal had an organization which united all the coal enterprises of the region. A trust existed here at one time. Then it was eliminated, and the mines and open pits were subordinated to the Irkutsk association "Vostsibugol'." But it was located far away and it had many problems in the Irkutskaya Oblast.

There is an acute need in all the enterprises of the coal industry for equipment that is adapted for working under northern conditions. The same walking excavators cannot be used at a temperature below -35 degrees. This temperature occurs here several months in the year. This question is not only important for the Transbaykal, but for all of Siberia.

The land beyond the Baykal is experiencing a rapid time of renewal. The decisions of the party and government here have created a powerful industry and agriculture is under intensive development. Enormous natural resources are being placed at the service of the nation. This is greatly promoted by the Baykal-Amur Trunkline. Trains will begin through traffic on it in the current five-year plan. The rates of development depend on the creation here of a power engineering base. This is why its problems require the most steady attention.

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